# NCDOT GUIDELINES ON THE MANAGEMENT AND DISPOSAL OF CONCRETE GRINDING RESIDUALS

## October 14, 2014

The North Carolina Department of Transportation (NCDOT) has prepared this guidance in order to describe the permitted options for the disposal of concrete residual waste liquids, slurries and solids generated by concrete milling, hydrodemolition, grinding, grooving and sawing of new or old concrete. This guidance will list and explain the alternate disposal options available to NCDOT contractors and subcontractors for disposal of concrete grinding residuals (CGR), including diamond grinding slurry (DGS) and hydrodemolition operation slurry (HOS). The programmatic permits available for reclaimed water use and land application, as well as the requirements from the Division of Waste Management for the burial of waste solids on NCDOT fill sections.

The NCDOT and its contractors are legally responsible for all industrial process wastes generated during construction, maintenance and preservation projects. The federal regulations from the Environmental Protection Agency (EPA) and the Resource Conservation and Recovery Act (RCRA) and corresponding waste disposal regulations from the North Carolina Department of Natural Resources (NCDENR) Division of Water Resources (DWR) (formerly Division of Water Quality (DWQ)) and the Division of Waste Management (DWM) follow hazardous wastes generated "from cradle to grave", requiring NCDOT to perform waste determinations, document, manage and dispose of wastes according to state and federal regulations. (See NC Hazardous Waste Management Rules http://portal.ncdenr.org/web/wm/hw/rules/statelaws )

Discharges of industrial process wastes (liquid or solid) to surface waters, to the ground surface or to the subsurface of the ground and/or in contact with groundwater require permit approval by NCDENR, DWR, and/or DWM. In 2011, NCDOT obtained a programmatic reclaimed water permit which allows the use of HOS/DGS waste water removed and treated to meet permit requirements to be used for irrigation or for dust control on NCDOT projects. In 2013, NCDOT received a programmatic statewide permit for land application of the HOS/DGS as a Class A residual. NCDOT has developed this guidance to assist Contractors in maintaining compliance with state and federal environmental regulations when working on NCDOT projects. This document addresses the collection, containment, management, handling, transportation and disposal or reuse options for both hydrodemolition and diamond grinding waste water, slurry and solids. This guidance sets forth the minimum steps required to maintain compliance with environmental regulations. It remains the responsibility of the Contractor/Subcontractor to determine whether more than these minimum steps are required and to perform whatever work is necessary to comply with all applicable laws and regulations.

## HOS/DGS Management Plan

The Contractor is required to submit a written HOS/DGS Management Plan at least thirty days prior to starting work. The Contractor shall submit the Plan to the NCDOT Resident Engineer for review and approval prior to starting work. The Management Plan will include the Sampling

and pH Control Plan, the Spill Control Plan and the chosen Disposal Plan option with written confirmation from the receiving facility.

Details in the Sampling and pH control Plan shall outline the methods of sampling, testing and calibration, monitoring, managing and neutralizing the pH in the HOS/DGS. The Contractor shall sample and test the HOS/DGS to determine if it is a characteristic hazardous waste (pH greater than or equal to 12.5). The pH neutralization must occur in a container, tank, or a transport vehicle. The pH Control Plan shall list all personnel, equipment, and supplies necessary to obtain samples, testing methods and calibration methods, method of monitoring, management and neutralization of the pH if required. The Contractor shall specify in the pH Control Plan what actions will be taken in order for the HOS/DGS to meet the pH requirements. A qualified employee of the Contractor shall administer the pH Control Plan. That individual shall be present on site during the hydrodemolition or diamond grinding work and shall be authorized to take all actions necessary for the successful implementation of any pH adjustments.

If the HOS/DGS is to be land applied, only percent solids, pH and the Calcium Carbonate Equivalent (CCE) are the laboratory tests that are required from each tank/truck load. Under the latest permit modification, the Contractor no longer has to sample for Toxicity Characteristic Leaching Procedure (TCLP) for the "RCRA 8" metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver). If the HOS/DGS solids are to be buried, only one representative sample for TCLP for the RCRA 8 metals is required per project.

## Collection and Containment

Total containment of the HOS/DGS is required during either hydrodemolition or diamond grinding operations. During the project operation, the HOS/DGS shall not be allowed to enter storm sewers, stormwater inlets, bridge drainage scuppers or downspouts or bridge approach downspouts, ditches, surface waters, soil surfaces, floodplains or wetlands, in order to be in compliance with state and federal regulations. All bridge deck joints and drains shall be sealed prior to starting work, in order to prevent the release of HOS/DGS to the ground surface or to surface waters. The Contractor shall include the efforts to prevent any release of HOS/DGS to the environment in the HOS/DGS Management Plan.

## Sampling and pH Control Plan

Once the HOS or DGS is collected and contained, the pH must be sampled before it can be transported from the project site. At a pH of 12.5 or greater, the HOS and DGS are considered hazardous waste under RCRA, and thus require compliance with the RCRA transportation, storage and disposal regulations under 40 CFR 260 - 280. HOS and DGS typically run at a pH of 11.8 – 12.7 but the pH can be lowered by adding muriatic acid. The pH does not have to be lowered below a pH of 10.0 or 11.0. The pH-monitoring plan will include calibration of the pH meter with pH 7.0 and pH 14.0 standards at least once per day. Field test and laboratory test for pH with at least one representative sample per day.

The Contractor will document all actions taken to adjust the pH and provide copies of the daily reports to the Engineer. The Contractor will certify in writing that the testing equipment to be

used is properly calibrated and include the data and correction information in the pH control plan. Test results shall be obtained by using EPA Method 9040 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846. (http://www.epa.gov/waste/hazard/testmethods/sw846/pdfs/9040c.pdf)

**Spill Control Plan**

A written Spill Control Plan will be submitted with the Sampling and PH Control Plan to address how accidental spills or releases of HOS/DGS will be prevented, contained, cleaned up and reported to NCDOT. When the HOS is allowed to flow into a bermed catchment basin on the bridge, a secondary berm must be installed and a back-up pump available in case of berm or pump failure. The Contractor is responsible for inspection and maintenance of all hoses and clamps, in order to prevent accidental releases. If a release of HOS/DGS occurs to the ground surface, surface waters or storm water ditches or conveyances, the NCDOT Resident Engineer and the Division Environmental Officer (DEO) shall be notified immediately.

**Disposal Options**

The Contractor may choose to dispose of the HOS/DGS at a Publicly Owned Treatment Works (POTW) or a permitted wastewater treatment plant (WWTP), and may dispose of the solids at a Municipal Landfill. The solids must pass the Paint Filter Test in order to be disposed of as a solid waste at a solid waste landfill. (See EPA Test Method 9095B at the following link: http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/9095b.pdf . Also, the pH will have to be lowered below 12.0 prior to transport or hauling in order to avoid hazardous waste transportation, storage or disposal requirements. The Contractor shall cover and contain the HOS/DGS to prevent loss to the environment during transport and delivery to the licensed facility. The HOS/DGS may also be hauled to a licensed treatment or disposal facility, in accordance with the approved Management Plan. The receiving plant, facility or landfill will need to be contacted prior to inclusion in the written waste disposal plan, to confirm that they will accept the HOS/DGS or solids. The written confirmation from the receiving facility shall be included in the Management Plan.

The HOS/DGS may be land applied under the Land Application of Diamond Grinding and Hydrodemolition Slurry/Wastewater (503 Exempt) Statewide Permit (DWQ #0035749). The land application operation must be in compliance with all conditions in the permit. See the entire permit, which includes the permit conditions, and the Operations Checklist, Operation and Maintenance Plan, Landowner Utilization Agreement, the Spill Control Plan, Inspection Log and Land Application Log at https://inside.ncdot.gov/stage/connect/resources/Environmental/Environmental%20Permits%20and%20Guidelines/Forms/AllItems.aspx. The Contractor or Certified Land Application Operator shall obtain a Soil Evaluation report from a North Carolina Licensed Soil Scientist in order to comply with the Land Application Permit conditions. The permit conditions are specific and are listed in the permits. All permit conditions must be met in order to be in compliance with the permit.

If the filtered water from the dewatering of the HOS/DGS meets the pollutant limits for Reclaimed Wastewater in DWQ Permit #0035386 (Bridge Hydrodemolition Conjunctive Reclaimed Water Utilization, Statewide), it may be used as irrigation water or for dust control on any level to gently sloping vegetated surface within NCDOT right of way. (Note: This option may not be feasible due to the Biological Oxygen Demand (BOD) limit exceeding permitted limits due to the Chemical Oxygen Demand (COD) from the concrete constituents.)

**Documentation**

The Contractor shall furnish the NCDOT Resident Engineer with a complete record for each tanker or truck load of HOS/DGS, with information on the point of generation, including the County name, Bridge number, State Project Number, the volume transported, and the name and location of the licensed disposal facility, or the location of the permitted disposal site. The Contractor shall submit all completed records to the Engineer prior to final payment. The Contractor shall provide documentation for Annual Reporting under the programmatic Land Application Permit by the end of the calendar year that the work was performed.

**Regulatory Permits and Policies**

The statewide, programmatic permits for the reuse of reclaimed water and for Land Application of HOS/DGS as well as the guidance memorandums from NCDENR DWM for the reuse of clean millings and for the burial of concrete residual solids as "beneficial fill". These permits and policy memos are listed below and can also be viewed at https://inside.ncdot.gov/stage/connect/resources/Environmental/Environmental%20Permits%20and%20Guidelines/Forms/AllItems.aspx .

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| DWQ Permit # 0035386 | Bridge Hydrodemolition Conjunctive Reclaimed Water Utilization, Statewide, Issued on 7/8/2011. |
| DWQ Permit # 0035749 | Land Application of Diamond Grinding and Hydrodemolition Slurry/Wastewater (503 Exempt) Statewide, Date issued: 4/24/2013. Date Revised: 6/3/2014. |
| DWM Guidance: | Memo for "beneficial fill" or burial of solids: June 6, 2013. |
| DWM Guidance: | Memo for clean millings reuse: March 15, 2012. |

HOS/DGS REUSE AND DISPOSAL OPTIONS

| TYPE OF WASTE | NCDENR DWM | NCDENR DWR/APU | NCDENR DWR/APU | DISPOSAL |
|---|---|---|---|---|
| | Guidance memo | DWQ #0035749 | DWQ #0035386 | |
| Milling solids | Driveways, road beds, burial in fill section | | | C&D or Municipal Landfill |
| Hydrodemolition liquids | | Land application | Reclaimed water | POTW |
| Hydrodemolition slurry | | Land application | | POTW |
| Hydrodemolition solids | Burial in fill section | Land application | | Municipal Landfill |
| Diamond Grinding liquids | | Land application | Reclaimed water | POTW |
| Diamond Grinding slurry | | Land Application | | POTW |
| Diamond Grinding solids | Burial in fill section | Land Application | | Municipal Landfill |
| Concrete sawing liquids | | | Reclaimed water | POTW |
| Concrete sawing solids | Burial in fill section | | | Municipal Landfill |

C&D = Construction and Demolition Debris Landfill

POTW = Publicly Owned Treatment Works or Wastewater Treatment Plant